



European Biofuels Technology Platform – Support for Advanced Biofuels Stakeholders

Report on the assessment of the European Biofuels Technology Platform Strategic Research Agenda

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European Biofuels Technology Platform – Support for Advanced Biofuels Stakeholders

Report on the assessment of the SRA 2008 and the SRA 2010

FINAL DRAFT

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EXECUTIVE SUMMARY

The European Biofuels Technology Platform (EBTP) has published its first Strategic Research Agenda – Strategy Deployment Document (SRA/SDD) in 2008. The current SRA/SDD version is an update from 2010. Despite political changes through the amendments of the Renewable Energy Directive and (RED) the Fuel Quality Directive (FQD), the fundamentals concerning the research and development for biofuels have not changed significantly since then. Within the EBTP-SABS project an update of the SRA is envisaged in 2015. A first step for the update, an evaluation of the status quo of the SRA, is provided through this report. The EBTP Working Groups ('Biomass availability', 'Conversion Process', 'End Use and Product Distribution', 'Policy and sustainability') have been activated to assess the latest SRA version from 2010. The results will be presented in the following report chapter wise. EBTP position papers from the Steering Committee and the Working Groups, which have been published since the latest SRA update, concerning a 2030 framework consultation, a review of the RED/FQD, ILUC and a Policy Tool, can be found as Annex of this report as well.

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LIST OF ABBREVIATIONS

BtL	Biomass to Liquid
EBTP	European Biofuels Technology Platform
EU	European Union
EV	Electric Vehicles
FQD	Fuel Quality Directive
GHG	Green House Gas
HD	Heavy Duty
HVO	Hydrotreated Vegetable Oil
ILUC	Indirect Land Use Changes
KTOE	Kilotonne of Oil Equivalent
MS	Member States
R&D	Research and Development
R&D&D	Research, Development and Deployment
RED	Renewable Energy Directive
SECA	Sulphur Emission Control Area
SDD	Strategy Deployment Document
SRA	Strategic Research Agenda
SSF	Simultaneous saccharification and fermentation
OEM	Original Equipment Manufacturer

Introduction

The European Biofuels Technology Platform (EBTP) has published its first Strategic Research Agenda – Strategy Deployment Document (SRA/SDD) in 2008. The current SRA/SDD version is an update from 2010. Despite political changes through the amendments of the Renewable Energy Directive and (RED) the Fuel Quality Directive (FQD), the fundamentals concerning the research and development for biofuels have not changed significantly since then. Within the EBTP-SABS project an update of the SRA is envisaged in 2015. A first step for the update, an evaluation of the status quo of the SRA, is provided through this report. The EBTP Working Groups ('Biomass availability', 'Conversion Process', 'End Use and Product Distribution', 'Policy and sustainability') have been activated to assess the latest SRA version from 2010. The results will be presented in the following report chapter wise. EBTP position papers from the Steering Committee and the Working Groups, which have been published since the latest SRA update, concerning a 2030 framework consultation, a review of the RED/FQD, ILUC and a Policy Tool, can be found as Annex of this report as well.

1 Sustainability and markets, regulatory framework & public awareness (SRA 2010, p.9-14)

Biofuels sustainability and policy are so intertwined that an integrated set of recommendations on these matters for an update of the SRA will be as follows. Key points are:

1. Biofuels development should be considered as part of an integrated strategy for the European low carbon society and bioeconomy, in which they are aligned with the production of biobased materials and chemicals as well.
 - Many advanced biobased technologies produce a spectrum of biofuels and biobased products, also needed to achieve the transition towards a future low-carbon and low-fossil economy. The role of biofuels in the future is in sectors with high emission reduction challenges and missing economically efficient alternative options.
 - A more integrated perspective will also help reaping the opportunities that biomass supply and advanced biorefinery technologies offer, both commercially and in terms of improving global sustainability.

More value-added products can also be vital for sound business cases and for attracting short to medium term investments, which will consequently help the biofuels and bioenergy sector to meet the targets of EU GHG reduction.

2. The search for sustainable biofuels can mobilise crucial global developments towards sustainability in general, and this is important.
 - Working towards the development of sustainable land use management strategies in the different climate and ecological zones in Europe and beyond can offer solutions for future cropping and also contribute to reduced deforestation, land degradation, soil erosion, irrigation water shortages, etc. Pursuing such development will be more fruitful than getting stuck in debates on issues such as ILUC and land grab, issues in which biofuels only play a minor role.

- Indirect effects occur in many ways, not only in land use, but also in the use of e.g. residues and wastes. These are relevant matters to deal with, not only in relation to biofuels, but also to all other sectors.
3. A clear, predictable and sufficiently stable policy framework post-2020 will be vital.
- The current discussion on the amendment of RED/FQD and COM(2013)17¹, COM(2013)18² and COM(2014)15³ results in a lack of consistency in the policy framework. These ongoing discussions create uncertainties for the implementation of biofuel, including hesitant technology development, especially of advanced biofuels.
 - A clear ambition for the transport sector is lacking in the current proposals on policy targets for 2030. There is a need to formulate the 2020 targets in a different way. Additionally some kind of target setting for 2030 will be necessary. Some member states have clearly defined advanced biofuels as an important factor for national GHG reduction in NETS sector.
 - In this policy framework, attention should be paid to advanced biofuels in the aviation and marine sectors, as these sectors do not have many alternative options to reduce their CO₂ footprint and fossil fuel dependency. The cost effectiveness of different application options has to be assessed in this context.
 - A double-counting incentive for advanced biofuels has not brought us much. See EBTP position paper on this issue (attached to the report). There must be better options to incentivize their development, e.g. a separate sub-target for advanced biofuels, of specific measures aiming at reducing investment risks in novel biofuel technologies. A system with feed in tariffs has been successfully in use for many years for small power plants generating energy by using windmills, photovoltaics and biogas/ biomass plants. Although this approach is more difficult to apply on transportation fuels these examples show how powerful such schemes are to bring new technology to the market. A sort of feed in tariffs should be very beneficial to move development efforts into full scale demonstrations.
 - A more homogeneous transposition of European laws into national regulations is needed: Reducing the diversity in national support schemes and sustainability schemes will also greatly improve the policy climate for biomass and biofuels. However it will be evident that national solutions will be different, reflecting for instance the country specific raw material availability and cost effective technology integration in regard to national forest, food and oil refinery industry.
 - Working towards a harmonised policy for sustainable biomass supply practices can facilitate implementation and also provide future investors with a clear framework and rules.
 - To secure the supply of biofuels a stabilisation of current biofuel use up to 2030 is needed. This includes reliability of planning and the therefor needed consistency of EU directions as well as technical continuity, periodically monitoring and check of

¹ COM(2013)17 Clean Power for Transport: A European alternative fuels strategy <http://cor.europa.eu/en/activities/stakeholders/Documents/com2013-17.pdf>

² COM(2013)18 Deployment of alternative fuels infrastructure <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2013:0018:FIN:EN:PDF>

³ COM(2014)15 A policy framework for climate and energy in the period from 2020 to 2030 http://ec.europa.eu/energy/doc/2030/com_2014_15_en.pdf

measures and instruments. This is a prerequisite for allowing demonstration and implementation of innovative biofuel concepts without a gap in the supply chain.

2 Biomass availability and supply (SRA 2010, p. 15-17)

Resource efficient and sustainable biomass supply remains an important issue both for achieving the policy and respective targets across different governance levels in Europe but also for attracting interest for new investments in biorefineries and bioenergy.

The recent debates for biofuels and the biobased economy focus mainly on the upstream and they are complex and controversial. While the bio-industries create new possibilities to support the income of farmers and the forest community by higher prices of commodities and sale of residues and to contribute thereby to inclusive, innovative and secure growth, the issue of their sustainable long term supply remains rather critical.

Second generation bio-industrial facilities are likely to be relatively large in order to benefit from economies of scale and the feedstock requirements will be considerable. To achieve this will require secure and efficient resource supply, rigorous quality control and the management of multiple suppliers when the delivery of feedstock cannot be met by a single one only. There are severe and novel logistic challenges in collection, transport, pre-processing and inventory management that have an important technical, socio-economic and environmental dimension and important implications on the energy balance and environmental footprint, and will need to be researched.

The EBTP activities for the next two years aim to facilitate work which will provide evidence based answers for the following questions:

1. What are the limitations biomass sustainability requirements may bring, in various scenarios, to the availability volumes in European/imported biomass? Clear assessments and dedicated workshops are required to improve understanding, achieve clarity, develop common understanding of the issues around supply and provide Member States with quantitative information for their future policy.
2. When sustainable biomass streams will be available with limited MS/EU resources, how can the MS and stakeholders plan to allocate biomass to various energy and non- energy sectors? What effects will this planning have on the European energy, climate and bioeconomy policy as well as on the future RTD &D priorities for 2020 and beyond? How will various criteria such as material efficiency, biomass cascading etc. change the biomass resource allocation. (Having in mind that European biomass sources are limited to cover all growing demands by various sectors, causing paying capability competition).

The work will be further structured to the following **five key priorities** and analyse the issues addressed in them.

1. Understand the availability of agricultural and forestry biomass and facilitate the development of sustainable and resource efficient supply chains
 - **Develop a common view** on sustainable biomass availability across different sectors (collaboration with the RHC, Forest Platforms, Plants of the Future, SusChem, ERTRAC as well as the Bioeconomy Panel and BBI)
2. Understand the competition for land and facilitate the evaluation and monitoring
 - **Competition in biomass use:** research should focus on defining criteria and indicators to assess sustainable and resource efficient biomass supply for the different sectors of the bioeconomy.

- Resource efficiency indicators to be discussed with other sectors (energy and non energy)
 - **Sustainable, innovative and cost-efficient feedstock** production, handling, pretreatment and storing technologies for different biomass resources to meet the quality requirements for the respective technologies.
 - Overview of low or no iLUC feedstocks; focus on waste/ residues
 - Extend to the neighboring countries of the Energy Community
 - Explore cooperation mechanisms for the deployment of sustainable value chains
 - Reduction of the biomass raw material costs for various bioenergy and biorefinery customers
3. Provide efficient feedback to policy formation and updates at EU28 and the Energy Community
 - **Future policy & implementation strategies** should enhance complementarity and synergies among different sectors using arable land and/or biomass.
 - Gap analysis for policy and financing of sustainable biomass supply
 - Benchmarking, capacity building, transfer of knowledge and engagement of stakeholders.
 4. Work on focus case studies to understand the good practices, success and failure factors at implementation level
 - **Develop a set of case studies (policy, supply & logistics, bioeconomy) at local and regional level** on sustainable biomass availability across different sectors
 5. Ensure industry, policy and R&D are well aligned and efficient communication channels exist
 - **Develop new plant/ tree varieties** (crop/tree breeding and physiology); **improve cultivation and management practices** (propagation, cultivation systems, etc.) to optimize water and other inputs and increase productivity.
 - **Optimize** associated equipment to minimize logistics chain costs and to meet conversion requirements (integrated harvesting, collection and transport solutions for fiber /bio-materials and energy).
 - **Develop large-scale logistics** for new feedstocks or underutilized resources, optimize along the supply chain.

3 Biofuels from Algae (SRA 2010, p. 18- 20)

The use of micro algae is still high on the research agenda within the energy sector, not only for the use of biofuels. Theoretical calculations show attractive potential for future algae-based biofuels, but cost reduction and scale-up are critical challenges. Also the integration with other process, within a biorefinery context, is crucial to allow the growth of algae for food, pharmaceuticals and biofuels at the same time.

Cultivation of algae for fuel purposes is still in the R&D phase, EC DG ENER is financing the first demonstration units, and so far there is still no established commercial production of algal biofuel within Europe. The basic technical suitability of algae fuel in the transport and aviation sector is given. The R&D recommendations given in 2010 are thus still relevant and up-to date. Additional, new milder and improved downstream processing and compounds extraction processes need to be developed, capable of producing not only lipids but other feedstocks for use in various industries, thus contributing to develop a more bio based economy. Different technologies ought to be considered simultaneously, as various compounds or families of compounds have to be separated and purified. This is a crucial step from a biorefinery point of view.

4 Conversion process (SRA 2010, p. 21-23)

Regarding the conversion process a lot has been achieved within the recent years. Both the biotechnical and thermochemical pathways have been actively developed from laboratories to demonstration and commercial scale units.

The **biochemical pathway** R&D&D has achieved a first acceptable industrial technology for 2nd generation Ethanol production. Big production units have been built in America (DuPont/Abengoa). The pre-treatment is not yet optimized but acceptable industrial solutions are currently available. Within recent years the enzymes costs have been strongly reduced. C5 conversion technologies are available. Simultaneous saccharification and fermentation (SSF), a process option for ethanol production from lignocellulosic feedstocks, is already industrially implemented. Further improvement of these conversion processes is needed but there are no longer high on the R&D&D list.

Within the **thermochemical pathway** through **gasification route**, first industrial pilot units have been successfully operated and demo units (larger than 20 MW feed) have started recently. The first commercial-scale units (output > 100 ktoe/a) are in design stage. In addition, new innovative processes with higher yields and lower production costs are in the RTO bench-scale and PDU. Advanced gas cleaning and catalyst development are the high priority topics for improvements. The development target is to reach over 55-60 % energy yield and production costs less than 0.8 €/toe from straw and wood-based feedstocks. The priority is to produce synthetic diesel or gasoline as drop-in fuels boosting rapid deployment in existing vehicle fleets. Also other alternatives are under development including methanol for marine applications and DME as diesel fuel in HD trucks. The industrial synthesis catalysts are available, even if improvements and overall process simplifications are needed to bring down the investment and operation costs. Additionally significant progress has been reached in biomass pretreatments by drying and torrefaction, which are in the demonstration phase. Torrefaction enables the adaptation of large-scale coal conversion technologies to biomass. Parallel to liquid synthesis products, SNG is an important alternative in countries with highly developed gas grid and distribution infrastructure.

For the **liquefaction route**, first commercial units are on stream based on **hydrotreatment** of various vegetable oils, tall oil and different residues and waste fractions from food industry. Capacity of these units in Europe are totally over 1 Mtoe/a and they produce high quality paraffinic diesel products with high blending ratios. The raw material basis of these plants is extensively enlarged to non-food sources. The **biomass pyrolysis route** has also progressed as the first commercial scale unit (Fortum) has started bio-fuel-oil production to replace heavy fuel-oil. The upgrading of bio-oils to transportation fuels and other advanced liquefaction alternatives is in an intensive research and development phase.

Currently, one key factor for success of the 2nd generation biofuels lies within synergies with existing facilities in forest, food and oil refining industries. Value chains which can use these synergies still offer the best economic and industrial framework to manage the high risk/high cost of deploying promising new technologies and thus help the transition from conventional to advanced biofuels. Such value chains and the development of a bioeconomy deserve priority attention.

The production cost of 2nd generation ethanol has been decreased significantly. By now it has reached 1st generation cost, under the condition that the lignocellulosic feedstock price is low enough (below 60\$/ton). The viability of the value chain of 2nd generation ethanol is now primarily depending on the feedstock price. It is possible that the biofuel technologies based on thermochemical processes, which are presented in national and EU flag ship programmes, will reach the cost level of fossil transportation fuels by 2020 after investments in development and public risk sharing.

Several new industrial units for advanced biofuels have been built and are going to start up in 2014/15. The graph below shows worldwide biofuels plants with an output >10.000 t/year both for the biochemical and thermochemical pathway. The graph shows that there are still significantly more plants in North America than in the EU, which might indicate that the technology leadership on this topic is increasingly being challenged.

Le décollage industriel de la G2 est en cours

Capacités construites ou en construction > 10 000 t/an

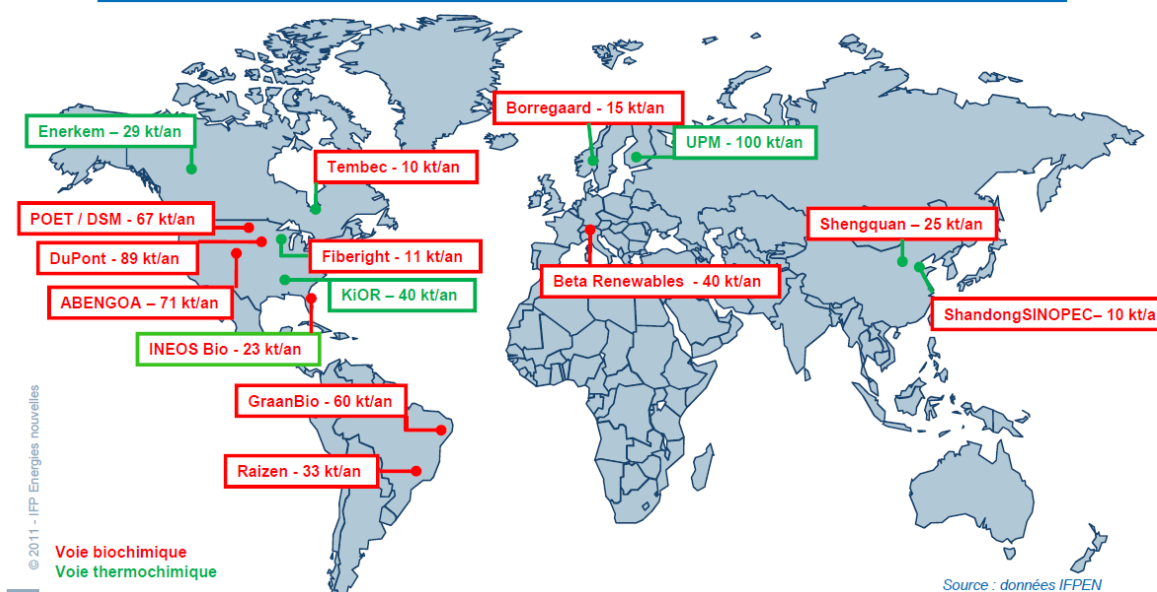


Figure 1 Construction capacities of advanced biofuels plants

Source: IFPEN data

5 Product distribution and use (SRA 2010, p. 24- 25)

Within recent years, the attractiveness on biofuels for transport has diminished; biofuels consumption within EU dropped by 6.8 % from 2012 to 2013⁴. The above already mentioned ongoing discussions of ILUC and the biofuels sustainability criteria are confusing the biofuels industry.

Concerning the different alternative road transport options, there is a significant interest in electric and fuel cell vehicles recently. According to OEM (Original Equipment Manufacturer) the supply of respective vehicles has been increasing significantly due to the CO₂ emission goals giving automotive manufactures an effective incentive to produce electric vehicles (EV). In contrast there are no real incentives for vehicles capable of running on biofuels. This development can also be seen in the Directive on the deployment of alternative fuels infrastructure (proposal COM(2013) 18) which is currently being finalized and which focuses on EV charging and gaseous fuels (LPG, CNG, LNG and H₂). The Directive mentions biofuels but doesn't set specific requirements for, e.g., E85 refuelling. Also, Methanol, Power-to-gas and power-to-liquids are gaining interest again. Although, from an end-use perspective, Methanol presents some challenges (e.g., toxicity).

Currently, the only advanced biofuel option (from an end-use perspective) on the market is hydrotreated vegetable oil (HVO). Some hydrotreated tall oil/tall oil pitch products are on the market or coming up. As far as actual BtL plants are concerned it has to be stated that they are still in an early planning stage.

Some changes have occurred within the different end use sectors. With the introduction of Euro VI emission regulations for heavy duty (HD) vehicles have been brought down to close-to-zero emission level. The implications are, that it is difficult to demonstrate the real benefits for regulated emissions using, e.g. paraffinic diesel or methane instead of commercial diesel, and that approvals for 100 % FAME will vanish. The calculatory environmental costs (NO_x, PM, Directive 2009/33/EC⁵) of Euro VI vehicles are close to zero, and thus comparable to EVs which can be seen in the graph below.

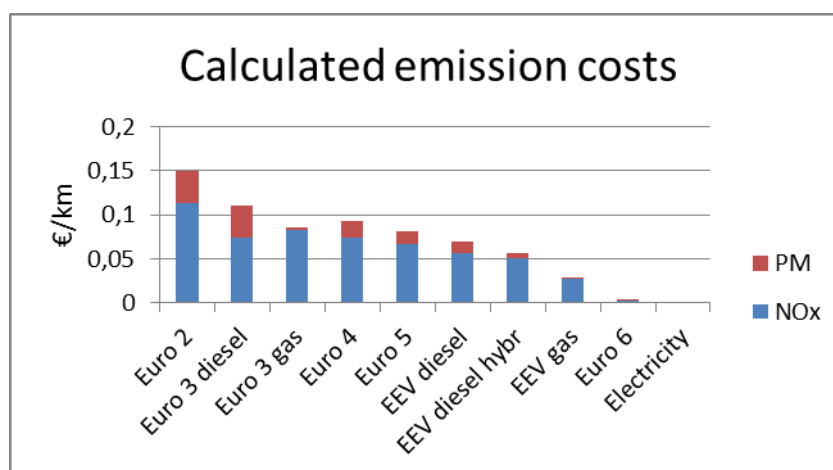


Figure 2: Calculated emission costs

Source: Nils-Olof Nylund (2014) calculated using the methodology of 2009/33/EC and actual city bus data from VTT

⁴ http://www.energies-renouvelables.org/observ-er/stat_baro/observ/baro222_en.pdf

⁵ Directive (2009/33/EC) - Promotion of clean and energy-efficient road transport vehicles
<http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0033&from=EN>

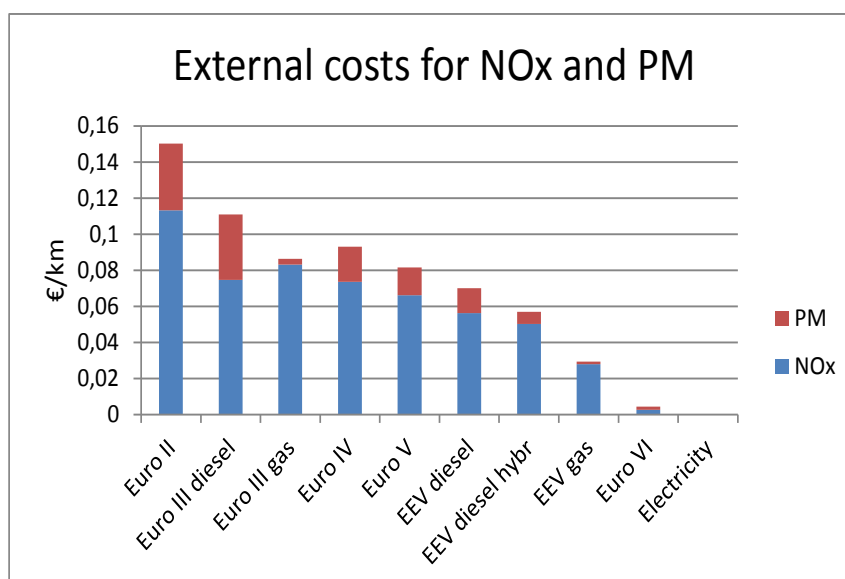


Figure 3: External costs for NOx and PM

Source: Nils-Olof Nylund (2014) calculated using the methodology of 2009/33/EC and actual city bus data from VTT

Within the marine sector, the new Sulphur Emission Control Area (SECA) regulations for the Baltic Sea and part of the North Sea will increase the demand for middle distillates, and will further increase the imbalance of petrol and diesel in Europe. Consequently there is a need to focus on biofuels replacing diesel/middle distillates. If the main driver for biofuels is GHG reduction, the marine sector will certainly be more cost effective than the aviation sector, which has more stringent fuel quality requirements.

Within the next years, one of the main R&D needs is to evaluate in which end-use applications biofuels deliver best pay-off. Passenger cars and city buses are easy to electrify whereas ocean-going ships and airplanes are not. Furthermore, drop-in fuels do not induce extra infrastructure costs or vehicle costs. This needs to be taken into account when it comes to future alternative fuels. We need to compare the true total costs (infrastructure, vehicles, energy) for vehicles running on liquid biofuels, gas fuelled vehicles and EVs.

Currently low efficiency and high methane emissions limit the usefulness of HD methane vehicles, and there is a need to develop better HD engines. There is a need to document the methane leakage in all stages of natural gas/biogas utilization before further deployment.

Current diesel engines cannot fully exploit the properties high-quality paraffinic fuels such as HVO. A kind of flex-fuel thinking with fuel sensors and adaptive engine controls could be implemented on diesel engines as well

Some items to be added on the next research agenda:

- Best use of biofuels within transportation (to cover all forms of transport, most cost effective value chains)
- If the EU 2030 energy and climate strategy only sets a target value for GHG emission reductions (no fixed requirement for renewable energy in transport) a calculation of the biofuel amounts needed to meet the climate targets of 2030 should be carried out, taking into account increase in transport work, improved vehicle energy efficiency and electrification of certain vehicle categories; deliver a motivation for continued work on biofuels; where should biofuels be implemented for best cost efficiency, a simple calculation could easily show that something like 30 % biofuels is needed to meet the 2030 climate target.

- Optimising engines for biofuels/alternative fuels, e.g. flex-fuel diesel engines utilizing HVO/BTL properties fully, better dual-fuel engines for methane, engine technology/calibrations allowing up to 30 – 40 % ethanol in SI engines

6 Overall Conclusion

As a conclusion from the received feedback from the Working Groups it can be said, that most of the content from the SRA/SDD from 2010 is still valid and does not need to be updated right now.

Nonetheless, some details have changed and there is a need for revision in the points mentioned earlier, especially regarding the changes of the RED/FQD and the omission of the transport sector in the targets of the 2030 framework for climate and energy policies. The revision process will start as a follow-up of this assessment report. The update of the EBTP SRA as well as the EBTP SDD will be published and promoted by September 2015.

Annex

EBTP-Position papers

1. June 2013- Green Paper – A 2030 framework for climate and energy policies
2. March 2013 – RED/FQD position paper
3. November 2011 - ILUC
4. October 2011 – Policy toolkit

1. Green Paper – A 2030 framework for climate and energy policies

Contribution by the European Biofuels Technology Platform to the Public Consultation

The European Biofuels Technology Platform, hereafter EBTP, welcomes the European Commission's Green Paper, 'a 2030 framework for climate and energy policies', as it aims at providing long-term vision and political commitment, which are key for the industries and the investors to take an investment decision.

As already highlighted in its [Policy Toolkit](#) to improve the support mechanisms for advanced biofuels, the EBTP believes that over the last years, barriers for these biofuels' deployment have moved from technology to policy and financing. Commercialization depends now on political leadership and adequate policies, as it is recognized that innovative energy technologies such as advanced biofuels are not yet cost-competitive against conventional biofuels and fossil fuels they aim at displacing.

Lessons learnt from the 2020 framework: the need for binding targets

Mandatory targets associated with penalties for failure to comply are the way to go as the progress made towards meeting the EU's 20-20-20 objectives shows: while Europe is on track for its 20% GHG emissions reductions and its 20% renewables share, it is lagging behind for its 20% efficiency objective, due to the lack of mandatory objectives.

The lack of policy clarity as a result of the ILUC debate has impacted the next stage of biofuels innovation and the building of a viable, sustainable bio economy.

The importance of a stable and consistent framework

Because the main energy demand growth and the steady increase in GHG emissions come from the transport sector, it is equally important to pursue sectorial targets as initiated by the RED towards 2020. The experience where the RED followed the first Biofuels Directive (Directive 2003/30/EC, containing merely indicative targets, largely missed by the vast majority of the Member States), is another illustration of the need for mandatory targets in the transport sector.

A clear and predictable policy and regulatory framework is absolutely necessary to industrialize advanced biofuels pathways. Investment decisions can only be taken based on robust assumptions within a long term perspective. In that sense, constant changes or uncertainties around the biofuels policy framework, as recently triggered by the review of the Renewable Energy Directive (RED) and the Fuel Quality Directive (FQD)⁶ only few years after their entry into force, are a source of concern for advanced biofuels industries:

- A possible abolition of support schemes for conventional biofuels after 2020 would jeopardize the future of existing biofuels units and corresponding jobs in Europe as well as impede investments in advanced biofuels projects;
- The conventional biofuels industry must be seen as a basis for advanced biofuels industrialization as operational, financial, and to a certain extent technical synergies exists with some advanced pathways. In this respect, it is advisable to keep a healthy sustainable conventional biofuels industry and set a limitation of mandates (if any) more compatible with already existing production/blending levels in all EU member states, therefore, facilitating the transition to advanced biofuels.

⁶ COM(2012) 595 final from 17 Oct 2012; the FQD was revised in 2009 to incorporate new decarbonisation objectives and sustainability requirements for biofuels.

Any renewable energy policy revision could have significant impact on both the RED and the FQD GHG emission saving targets. The achievability of RED and FQD targets must be carefully assessed, and instruments must be consistent. In the past, the introduction of multiple counting for advanced biofuels in the RED had negative implications on the achievability of the FQD targets since multiple counting was not replicated.

Dedicated instruments for advanced biofuels, reflecting their level of maturity

In the RED the European Union opted to encourage the diversification of feedstocks used to produce biofuels by introducing the double counting rule. Biofuels derived from wastes, residues and lignocellulosic feedstocks count for double their real energy value in terms of their contribution to the national objectives. This administrative support was meant to initiate a greater interest in using this type of biofuels and could create indirectly a greater value for those products. However this instrument seems not to be sufficient to create conditions for investment in breakthrough technologies and to boost advanced biofuels deployment. Also in the 27 National Renewable Action Plans very little consideration is given to double counting material-based biofuels. Support schemes whose interpretation remains at the discretion of Member States also create distortion because of uneven application.

Against this background, the EBTP believes that a quantitative, binding target for advanced biofuels would reduce investment risk and lower competition with well-established biofuel pathways. Mandatory targets will only be effective if they are combined with high and stable, mandatory penalties for non-compliance – the proceeds of which could be returned to producers or contribute to the financing of demonstration and flagship plants.

The EBTP recommends a differentiated approach for advanced biofuels depending on their level of maturity. It believes that the extra-incentive, in the form of multiple counting for instance, appears no longer necessary for those pathways that appear to be already mature and competitive with conventional biofuels, e.g. biodiesel from used cooking oil or tallow. Extra-incentives should be targeted and earmarked for innovative technologies with a high implementation potential, a high GHG reduction potential compared to fossil fuels and upfront development and demonstration. When a technology matures, the extra-incentive should be phased out in a smooth transition allowing building on learning curve and economies of scale.

Competitiveness and security of supply

According to the World Energy Outlook 2011 of the International Energy Agency, the EU will further increase its dependence on oil imports by 2035. The substantial increase in energy demand expected globally (+40% between 2009 and 2035) will be accompanied by an increase in prices, with crude oil prices expected to rise to USD 140 (in year 2010 USD) by 2035 in a 'business as usual' scenario. Europe's high dependency on oil from a few countries poses a serious risk for its economy. One of the conclusions that the IEA draws is that "the most obvious action that oil-importing countries can take to reduce the impact of high prices on their economies is to reduce their reliance on oil". This will not happen without mandatory targets for renewable energy.

According to the International Energy Agency (IEA) Technology Roadmap Biofuels for Transport, biofuels could provide up to 27% of world transportation fuel by 2050, delivering significant CO2 emission savings when produced sustainably and thus contributing to climate change mitigation. However, currently announced advanced biofuel projects would be sufficient to meet the roadmap vision only until 2015. Beyond 2015, considerably more new projects will be needed, and even more so after 2020.

The benefits of the creation of a healthy European biofuels industry lies not only in the climate change mitigation potential but biofuels production represents also a major opportunity for the European economy, especially in rural areas.

When developing ambitions for advanced biofuels deployment, it will be necessary to remember that any policy change must take into account the singularity of the European fuel market in terms of diesel/gasoline demand to ensure that biofuels continue to effectively contribute to Europe's security of energy supply.

Conclusion

Without additional policy measures to stimulate investment in scale-up, supply of relevant feedstocks and up-take of advanced biofuels, Europe is missing a unique, sustainable industrialization opportunity within the wider concept of bio-economy that offers leveraging with biotechnology and thermochemistry based industries.

The EBTP therefore recommends the EU to

- Develop a long term vision and a stable regulatory framework for the European advanced biofuels industry, placing at its heart the contribution it makes to European energy security, restoring economic growth and employment opportunity, and climate change mitigation.
- Set ambitious yet achievable targets for biofuels post 2020, incl. nested binding sub-targets for advanced biofuels.
- Sort out the ILUC debate so that investors and biofuel producers have policy clarity regarding the next stage of biofuel investment.

2. European Biofuels Technology Platform (EBTP) Comments on the European Commission proposal to review the RED and FQD March, 2013

Background

The EBTP has been reflecting on the European Commission's proposal to review the RED and FQD. An iLUC working group was created for the purpose of putting together a more general position for the EBTP⁷. The premise of this reflection is founded on the need to find a solution to the iLUC debate whilst ensuring that biofuels technology and science evolves and continues to be relevant to the EU's objectives to, improve energy security, fulfill GHG emissions reduction goals and ensure continued innovation in the creation of a sustainable bio economy.

On 17 October 2012, the European Commission released a proposal for a revision of the European biofuels policy⁸. Four major changes have been proposed upon which we would like to comment:

- Incorporation of biofuels produced from food crops (cereals, sugar and vegetable oil) would be limited to 5% in terms of energy content out of the target of 10% of renewable energy in transport by 2020.
- Reporting of indirect land use changes (iLUC) by using fixed factors.
- Strengthening of sustainability criteria (all new biofuel plants would have to reach immediately a minimum greenhouse gas savings of 60 % compared to fossil fuels emissions).
- Introduction of additional support for biofuels produced from non-food feedstocks by weighting differently their contribution towards the 10% renewable energy target.

The EBTP has been closely following the iLUC policy and public discussion since its inception. Although the EBTP understands and supports the need for sustainable biofuels, the EBTP continues to question the effectiveness of policy measures, which only target the biofuels industry. In a contribution to the public debate on iLUC in 2011², EBTP expressed its reservation on the effectiveness of policy measures that would only target the biofuels industry. The EBTP realizes that this proposal reflects a political compromise on indirect land use change and the use of biofuels but its members are not convinced that changing the current target on biofuels produced from food crops is the most effective way to ensure more sustainable conventional biofuels are indeed produced and a greater share of more advanced biofuels penetrate the market. Although the companies and organizations who participate in the EBTP welcome the additional attention toward biofuels produced from non-food biomass⁹, it is important that the EC's proposal supports the deployment of advanced biofuels without hindering the competitiveness of existing sustainable biofuels based on food crops. To achieve this goal, it is necessary to set up a strategic vision for the European biofuels sector, coherent with its potential contribution to European energy security, economic growth and climate change mitigation.

Capitalizing on Conventional Biofuels¹⁰

A clear and predictable policy and regulatory framework for 2020 and post 2020 is absolutely necessary to industrialize advanced biofuels pathways (refer to definition box below). Investment decisions can only be taken based on robust assumptions within a long term perspective.

In its strategic research agenda, EBTP proposed the following definition:

⁷ 2Read EBTP's contribution to the iLUC debate:
http://www.biofuelstp.eu/downloads/papers/paper_iluc_ebtp_oct_11.pdf

⁸ 1Proposal for a Directive of the European Parliament and of the Council amending Directive 98/70/EC relating to the quality of petrol and diesel fuels and amending Directive 2009/28/EC on the promotion of the use of energy from renewable sources (COM(2012) 595 final).

⁹ In the proposal of the European Commission, biofuels produced from non-food biomass would have a reserved market share of 5% of energy consumed in the transport sector, including administrative shadow effect of multiple counting

¹⁰ In this document, conventional biofuels refers to ethanol from starch and sugar crops and biodiesel from vegetable oil (esters or hydrotreated vegetable oil). They are often referred to as first generation biofuels

“advanced biofuels are characterized either by a wider range of feedstocks (including cellulosic feedstocks from residual/ waste biomass, dedicated energy crops as well as new concepts (e.g. algae, etc) or by enhanced fuel properties of the end product, when compared to current biofuels (ethanol and esters), or are chemically closer or identical to fossil fuels, and hence allow the use of current fuel infrastructures⁵ (pipe, storage, engines) without technical limitation. Advanced biofuels can be produced via thermochemical or biological process steps or a combination of both. They are often referred to as second generation biofuels”.

In addition, it should however be emphasized that compatibility between fuel standards and vehicles should be a key feature for conventional and advanced biofuels¹¹.

As it currently stands, the new proposal falls short of bringing a stable framework to the biofuels sector and investors. Additional uncertainties to an already precarious framework have been introduced by the new proposal, including the possible reviews of RED and FQD directives in 2014, and the risk of inclusion of iLUC factors, which remain scientifically and politically controversial, into the sustainability criteria of biofuels after 2020. A possible abolition of support schemes after 2020 would at the same time jeopardize the future of existing biofuels units and corresponding jobs in Europe as well as impede investments in advanced biofuels projects.

The conventional biofuels industry must be seen as a basis for advanced biofuels industrialization as technical, operational and financial synergies exist with advanced pathways. In this respect, it is advisable to keep a healthy sustainable conventional biofuels industry and set a limitation of mandates more compatible with already existing production/blending levels in all EU member states¹², therefore, facilitating the transition to advanced biofuels.

Keep a balanced approach on iLUC and biofuels sustainability

Setting a limit on conventional biofuels produced would already reduce the risk of iLUC significantly. Since the iLUC effect is a marginal (additional) effect, grandfathering of existing production units and allowing their possible retrofit to other molecule productions would be coherent with this political approach.

It is also important to note, that given that food crops and land are not dedicated to biofuels exclusively, it might be counterproductive to introduce excessive sustainability criteria only for biofuels. Creaming off the most sustainable feedstocks for biofuels production does not improve the overall sustainability of agriculture. A 50 % GHG saving contribution appears to be a sensitive safeguard and can provide a significant contribution to climate change mitigation. On the contrary, a more stringent GHG saving threshold might reduce the overall contribution of biofuels due to a lower availability of such products.

Any biofuels policy revision could have significant impact on both the Fuel Quality Directive GHG emission saving targets and the incorporation of 10% of renewable energy in transport energy consumption by 2020. The achievability of RED and FQD targets must be carefully assessed in light of the proposed changes. In addition, it is important to remember that any policy change must take into account the singularity of the European fuel market in terms of diesel/gasoline demand to ensure that biofuels continue to effectively contribute to Europe's security of energy supply.

A fair promotion of advanced biofuels pathways¹³

EBTP stakeholders support the EC's intention to accelerate the deployment of advanced biofuels in Europe. A stable and ambitious framework is needed to attract the necessary investments in advanced biorefineries and drive the development of advanced biofuels from non-food biomass. A

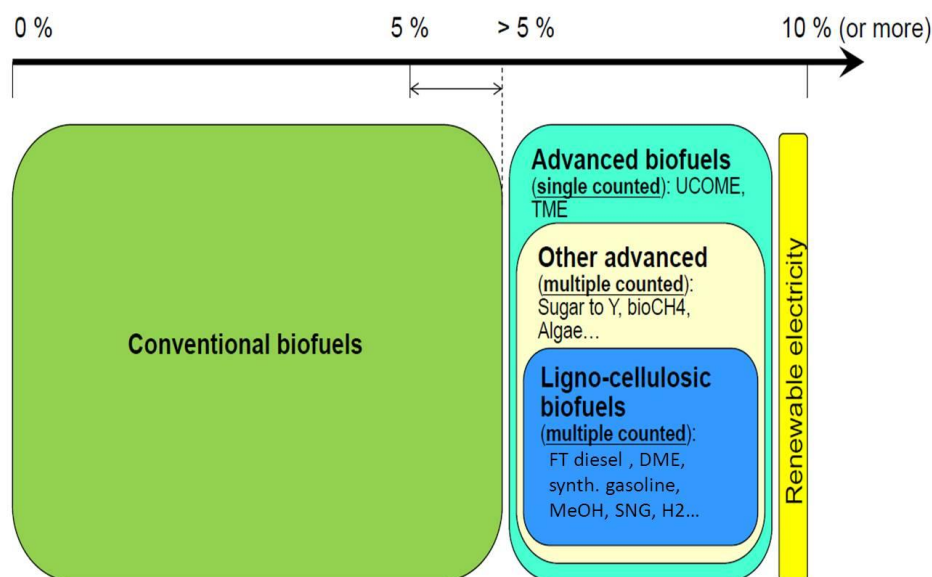
¹¹ Nevertheless, some types of biofuels (e.g. DME, liquefied or compressed biomethane for instance,...) under development may require specific power trains and/or specific infrastructure. Initially they will probably address above all niche markets and captive vehicle fleets.

¹² Several member states are well ahead of the 5 % limit. France, for instance, has a target of 7% energy since 2010.

¹³ Advanced biofuels pathways with highest industrialization potential in Europe have been listed in the strategic research agenda (see http://www.biofuelstp.eu/srasdd/SRA_2010_update_web.pdf page 27).

recast of the renewable energy framework to maximize the contribution of these biofuels should be considered as follows:

Figure 1: Illustration of EBTP recommendations for an improved biofuels regulatory framework



- The existing double counting provision has been used to spur deployment of new biofuels pathways that use alternative feedstocks. However, since the intention of double counting was to help those pathways to become competitive (RED Recital 87), the extra-incentive in the form of double counting appears no longer necessary for these pathways that appear to be already mature and competitive with conventional biofuels such as biodiesel from used cooking oil or tallow. Still they would keep a dedicated sub-target. Multiple counting should be targeted and earmarked for innovative technologies with a high implementation potential¹⁴ and upfront development and demonstration costs. When a technology matures, multiple counting should be phased out in a smooth transition allowing building on learning curve and economies of scale. Some MS have introduced double counting successfully to boost new technologies and non-food new raw materials in national incentives.
- Biofuels policy leverages innovation in biotechnologies and bio-based chemistry. Conventional sugar is the natural substrate to biotechnologies and a bridge to cellulosic sugars. Sugar to Y technologies also contributes to the diversification of feedstock supply. Sugar-to-advanced biofuels pathways should therefore be kept in the advanced biofuels sub-target.
- When it comes to the most innovative biofuels pathways, return on experience has showed that multiple counting should be complemented by dedicated sub-targets to bring support and market visibility. The opportunity of setting a nested sub-target¹⁵ for ligno-cellulosic biofuels within an “advanced biofuels” sub-target should be assessed. Such a design of the mandates would bring better long term perspectives to investors and a fair level of competition to the market
- Implementation measures to incentivize advanced biofuels shall be designed to avoid fraud and to bring transparency to investors. Having a European-wide, harmonized, fraud proof scheme of implementation of the multiple counting or nested sub-targets measures is a basic need for the market. Checking the eligibility of plants according to their

¹⁴ Read also EBTP’s contribution to this topic: <http://www.biofuelstp.eu/policy/policy-toolkit-ebtp-06-10-2011.pdf>

¹⁵ The ligno-cellulosic biofuels target would contribute to the non-food target. Other advanced biofuels would be eligible for the non-food target. Hydrotreated vegetable oils are in the “biofuels from food crops” compartment. The US renewable fuels standard (RFS2) is built with several, similar, nested mandates.

technology and their biomass supply, and setting a tracking system of each biofuels consignment traded in Europe is a necessary counterpart of the support schemes. Alternatively, the allocation of this support to specific plants, using well targeted technologies, with an assessment of their feedstock supply, through a kind of European tender, could bring the industry more confidence in those products.

In conclusion, the EBTP believes that some amendments are urgently needed, and recommends the following:

- Develop a long term vision and a stable regulatory framework for the European advanced biofuels industry, placing at its heart the contribution it makes to European energy security, restoring economic growth and employment opportunity, and climate change mitigation. Set achievable targets for other biofuels for 2020 and post 2020¹⁷10. Such target would have to include nested sub-targets for advanced biofuels as shown in Figure 1.
- Amend the multiple counting to target advanced innovative biofuels. The multiple counting should indeed reflect the potential and the complexity of the technology. Once pathways are mature enough, this support should be phased out.
- Implementation measures should support innovation and avoid fraud. The list of eligible feedstocks shall be coherent, harmonized across the EU, and avoid grey zones.
- Additional European support measures should be considered for new advanced biofuels production plants to foster investments in the upscale. In particular: grants, loan guarantees and other relevant public private funding mechanisms.
- Consider setting a higher limit for conventional biofuels to allow for a viable transition to advanced biofuels and recalculate iLUC factors accordingly, taking into account only the deviation to 5%. Biofuels production units would be grandfathered for their historical production pattern whereas additional production would have to report iLUC. In any case, retrofitting existing biofuels shall be allowed without iLUC penalties (unchanged biomass supply).

EBTP background and contacts

The mission of the European Biofuels Technology Platform (EBTP) is to contribute to the development of cost-competitive, world-class biofuels technologies, to the creation of a healthy biofuels industry and to accelerate the deployment of sustainable biofuels in the European Union through a process of guidance, prioritisation and promotion of research, technology development and industrial demonstration. The European Biofuels Technology Platform brings together a wide range of stakeholders from industry, academia, research and civil society, and is supervised by a Steering Committee. The activities are carried out by the members of four Working Groups, with this document being prepared by members of WG4 on Policy and Sustainability. Member State representation is provided through the EC Steering Group for Strategic Energy Technologies, and liaison with national biofuels platforms and bioenergy associations. The EBTP is supported by a Secretariat that received partial financial support from the European Commission under FP7 Grant Agreement Number 241269 (until end of March 2013). For further information, please contact secretariat@biofuelstp.eu or refer to the EBTP website www.biofuelstp.eu

¹⁷The strategic research agenda of the EBTP brings a sound framework to identify best promising advanced biofuels pathways: http://www.biofuelstp.eu/srasdd/SRA_2010_update_web.pdf

**3. iLUC In the context of the discussion around indirect land use change for biofuels, the European Biofuels Technology Platform holds the view that there is an opportunity for the EU to signal its support to policies that further enhance the deployment of advanced biofuels.
November 2011**

Background

Biofuels in Europe are front-runners in the demonstration of their environmental sustainability. They are the only products derived from agriculture and forest¹⁸ that have to demonstrate their origin and their carbon footprint, in contrast to food, feed, other bio-energies and other uses of the biomass.

The December 2010 report from the European Commission¹⁹ indicates that some consensus has now been reached regarding the fact that a) biofuels feedstock production can cause indirect land use changes, b) the variability of estimates is wide and the uncertainty of model results is high. However, most recent studies indicate that ILUC would be less significant than initially thought.

The European Commission currently studies the opportunity of revising the biofuels policy, after the adoption in 2009 of complex sustainability criteria which are still being implemented by the Member States. Four options are being considered in the European Commission's Impact Assessment that will be accompanied, if appropriate, by a legislative proposal to be discussed by the European Parliament and the Member States:

1. Carry on with the analytical work and take no additional measure for the time being;
2. Increase the regulatory thresholds for emissions reductions for biofuels;
3. Introduce new regulatory measures on sustainability for some specific biofuels;
4. Allocate biofuels with a factor in the greenhouse gas calculation methodology representing the estimated amount of emissions due to ILUC.

EBTP's views

All around the world, policies for biofuels development rely on three pillars: improvement of the national energy security, mitigating greenhouse gas emissions, and economic development. Whilst different countries give different priority to these three pillars, mitigating GHG emissions is only one of these three motivations and should therefore not be the sole determinant of political decisions.

Indirect changes are not specific to biofuels. In the 2009 pre-consultation and the 2010 consultation the vast majority of stakeholders agreed that since biofuels' indirect impacts are merely direct impacts of other land-related activities, it should be a political priority to prevent adverse direct land use changes everywhere in the world, whatever the land-use is. This could be reached through:

- ✓ Political international binding initiatives to protect areas with high environmental value (protection of primary forests and high carbon stocks, support for tropical wood certification, etc.)
- ✓ Climate policies which take into account all LUC effects in all countries, and cap those emissions globally.
- ✓ An extension of the current sustainability criteria to all land-based activities and energy production, since nothing justifies limiting these criteria to biofuels only.
- ✓ Support to farming yields improvement (through seeds improvements and farming management) as the increase of biomass availability reduces the indirect land use changes.
- ✓ An effort, at European level, to limit artificialisation of the lands (road construction, urbanization, etc.).

The first three options clearly require some time to negotiate internationally, and even more for their practical implementation. Bilateral agreements between the EU and key countries exporting biofuels or biofuel feedstocks could help to foster international agreements, and could build on successful examples regarding biodiversity and illegal logging.

With the discussions at the European Commission level being increasingly focused on either proposing specific production pathways factors or increasing the minimum GHG threshold, the EBTP recalls that indirect land use emissions cannot be observed or measured but merely modeled, modeling being an extremely complex exercise because it relies on innumerable assumptions. None

¹⁸ In the wood industry, there are voluntary certification systems (ecolabels), with PEFC (Program for the endorsement for the Forest certification) and FSC (Forest stewardship council) being the most known.

¹⁹ Com (2010) 811 final from 22 Dec 2010

of the two options considered above would actually help fighting indirect impacts, but would simply penalize the biofuels industry without bringing any sustainability benefit, significantly threatening the achievement of the EU 2020 objectives. Furthermore, these policy options will have no impact on the land use policies implemented in countries outside the EU, which will continue using biofuels in order to diversify their fuel supply.

However, EBTP recognises the need for closure in the ILUC debate, seen as being counterproductive because generator of a high level of uncertainty which tends to freeze investments in advanced biofuels units. These investments are necessary to reach the targets for incorporation of renewable energy in transports at European level. It is therefore imperative to focus on making sure that the existing sustainability criteria are correctly implemented and that their objectives are reached, and support the fast deployment of advanced biofuels, without hindering the competitiveness of existing sustainable biofuels. This policy approach will ensure that the EU biofuels policy will deliver on each of its three main objectives, without putting in danger the sector it is trying to regulate.

Should any ILUC-related regulatory measures be adopted, they should consider the following constraints and principles:

- ✓ Take into account the singularity of the European fuel market in terms of diesel/gasoline demand in order to make biofuel policy effectively contribute to the security of energy supply;
- ✓ Be aware that conventional biofuels will still represent the overwhelming majority of biofuels available by 2020;
- ✓ Provide an accurate fossil fuel emissions value for the comparison with biofuels emissions;
- ✓ Be scientifically based;
- ✓ Foster land use optimisation;
- ✓ Pave the way for innovation;
- ✓ Provide for security for investments through an implementable and stable policy framework;
- ✓ Be WTO compatible.

To that end, EBTP recommends the European Commission:

- ✓ **Further encourage the improvement of GHG lifecycle performance of biofuels through the existing regulation:** this is already foreseen with the GHG threshold successive increases (at least 50% and 60% savings).
- ✓ **Provide for the rapid deployment of ‘advanced biofuels’:** financing the Industrial Bioenergy Initiative (EIBI)²⁰ is a priority in that respect.
- ✓ **In its RED and FQD 2014 revision further promote advanced biofuels as a whole.**
- ✓ **Acknowledge that none of the current four envisaged solutions is ideal and that in the short-medium term, the EU will commit to address land use changes altogether with the right instruments and consider all land-using sectors instead of focusing on biofuels only.**

²⁰ See www.biofuelstp.eu/eibi.html

4. Policy toolkit to improve the support mechanisms for advanced biofuels²¹ *Living document from EBTP* October 2011

Over the past five years, barriers for advanced biofuels have been moving from technology to policy and financing. Commercialization depends now on political leadership and adequate policies, as it has to be acknowledged that new innovative energy technologies like advanced biofuels are not yet cost competitive against conventional biofuels and fossil fuels. The issue of financing innovative biofuels pathways is crucial to ensure large scale deployment across Europe.

By introducing the double counting rule, the European Union has tried to diversify the supply of biomass used to produce biofuels. This measure can provide an effective support to some advanced biofuels pathways²². However, Member States' failure to effectively implement the rule in their national renewable energy initiatives is a discouraging signal to the emerging advanced biofuels industry²³.

Long term vision and political commitment are key for the industries and the investors to take a decision of investment of this order of magnitude. Unfortunately divergence in interpretation, imperfection of the measure and most of all short term political decisions creates a lot uncertainty which is fully incompatible with the industrialization of these pathways.

Without additional policy measures to stimulate investment in scale-up, supply of relevant feedstocks and up-take of advanced biofuels, Europe is missing a unique, sustainable industrialization opportunity within the wider concept of bioeconomy that offers leveraging with biotechnology and thermochemistry based industries. In comparison the tremendous amounts of public money committed to advanced biofuels R&D, demonstration and flagship plants invested during the last three years in the US²⁴ is a very convincing illustration of what is at stake.

A combination of the incentives shown below will help to overcome the obstacles inhibiting investment into advanced biofuel scale-up and bring advanced biofuel technologies across the "valley of death" between R&D and commercialization – a valley we need to cross to ensure future low cost and EU-based production of advanced biofuels. It will be necessary to take into account the singularity of the European fuel market that is extremely dieselized and dependent from diesel imports: additional attention and support will have to target pathways that will contribute to the European energy security.

1- On the demand side:

- **The double counting** measure gives an administrative energy bonus and thus economic value to some biofuel pathways (those that produce biofuels from wastes, residues or lignocellulose). It has no budgetary impact. However this instrument seems not to be sufficient to create conditions for investment in breakthrough technologies and to boost advanced biofuels deployment. Also in the 27 National Renewable Action Plans very little consideration is given to article 21.2 material-based biofuels. The tool suffers from uneven implementation

²¹ **Advanced biofuels** are defined either by a wider range of feedstocks (including cellulosic feedstocks from residual/ waste biomass, dedicated energy crops as well as new concepts (e.g. algae, etc) or by enhanced fuel properties of the end product, when compared to current biofuels (ethanol and FAME biodiesel), or are chemically closer or identical to fossil fuels, and hence allow the use of current fuel infrastructures (pipe, storage, engines) without technical limitation. Advanced biofuels can be produced via thermochemical or biological process steps or a combination of both. (definition taken from the EBTP strategic research agenda) .

²² The valuable contribution of sugar based advanced conversion technologies has been omitted, although their contribution could be very significant to address the European needs of advanced biodiesel and other advanced molecules.

²³ So far only the Netherlands and France have transposed this measure for residues only. Germany, Austria and Denmark are about to implement it partially in their national regulations. Sweden and Finland have introduced broader policy packages with incentives for advanced biofuels.

²⁴ Furthermore the return of investment seems to be quite short: the 15 initial public offering of start-ups involved in bioeconomy-related technologies that occurred in the USA during the last 12 month total 1.1 Billion USD up Solazyme, Gevo, Amyris, Kior are some of the recent start-ups. The order of magnitude is about 2 billion USD of public money. The last measure was announced in August 2011; it consists in a 510 MUSD support for advanced, drop-in biofuels for aviation, marine and other commercial use. This public money will be invested by the departments of Energy, Agriculture and Marine will be mobilized through a public/private partnership.

across Member States. If larger volumes of advanced biofuels were available, the tool would likely be of use.

Once this measure is adjusted to cover adequately all advanced biofuels pathways, without offering windfall profits to some specific sectors or creating conflicts of use of feedstocks, the double counting could become an excellent way to accelerate the industrialization of advanced biofuels. In order to reduce regulation uncertainty and accelerate private investment, an ambitious European tender that would give well targeted advanced biofuel pathways projects the benefit of the double counting during a fixed period of time (15 to 20 years) could substantially accelerate the implementation of these advanced routes. Biofuel consignments from double counting plants would benefit from the mutual recognition by Member States. Further explanation about the need to adjust the double counting rule is given in annex.

- **Binding blend-in target.** A ramping-up, achievable sub-target for advanced biofuels would secure a market share. It would also reduce investment risk and lower competition with well established biofuel pathways. Mandatory targets will only be effective if they are combined with high and stable, mandatory penalties for non-compliance – the proceeds of which could be returned to producers or contribute to the financing of demonstration and flagship plants. Advanced biofuels would remain eligible for the rest of the blending target, once the sub-target is fulfilled. Technology neutrality is critical for this measure- no winners should be picked upfront. With this measure the market would settle the price needed to ensure sufficient production. There would therefore be no budgetary implications for the EU or its Member States.
- **Tax incentives.** These could be implemented in the Energy Taxation Directive, which is currently under revision. However tax incentives have fiscal consequences for Member States and their implementation might not be easy in the existing budgetary context.
- **Production support/Feed in Tariff.** Initial fixed sales prices or fixed premiums help improve the case for the investors that are needed to build the first wave of commercial-scale plants. The costs of such a scheme could be capped by limiting it to a fixed accumulated volume for specific plants (like for wind farms). If governments are to guarantee the fixed sales prices/premiums, budgetary constraints may question implementation, similar to tax incentives.

2- On the supply side:

- **Feedstock collection and supply-chain incentives.** In most EU countries there is no or limited experience with large-scale collection and storage of biomass. Therefore incentives are needed to help establish agriculture and forestry biomass supply-chains and thus reduce feedstock uncertainty and the overall risk of advanced biofuel scale-up investments. It would also promote EU production and self sufficiency. These incentives could be implemented in the Common Agricultural Policy (CAP) revision as part of redirecting the CAP towards sustainable and renewable energy but it should also cover the mobilization of woody biomass from forest, underpinning recent initiatives in the forest sector.

3- On the investment side

- **A realistic investment support for demonstration and first-of-its-kind commercial-scale plants (financing of EIBI).** The up-front investments required for building these plants is significant (€50-1000 million) and risky – not least because they will have to compete with existing, non-renewable and un-sustainable energy technologies. Compounding this, the ongoing global financial and economic crisis has made investors and lenders more risk averse. Getting equity and especially debt finance for demonstration of first-of-its-kind commercial scale plants is therefore proving close to impossible. Financing the European Industrial Bioenergy Initiative (EIBI²⁵) is one of the last opportunities not to miss the train of the advanced bioeconomy.

²⁵ For more information, see: <http://www.biofuelstp.eu/eibi.html>

These incentives would be enough to kick-start investment on the scale needed to deliver tangible benefits such as increased energy self sufficiency, lower greenhouse gas emissions from transport, and increased economic activity in EU agriculture and industry.

ANNEX – Double Counting

Context and description of the support

In the renewable energy directive (2009/28/EC: “RED”) the European Union opted to encourage the diversification of feedstocks used to produce biofuels. Biofuels derived from wastes, residues and lignocellulosic count for double their real energy value in terms of their contribution to the national EU mandates. This administrative support was meant to initiate a greater interest in using this type of biofuels and could create indirectly a greater value for those products. **In this respect the double counting can be a great support for advanced biofuels but return on experience suggests it should be optimized and complemented.**

Difficulties risen by the actual drafting of the double counting mechanism

- Lack of definition of residues and diverging implementation.** The concept of lignocellulose leaves little space for interpretation as it is widely understood that this term covers woody biomass, straw and similar substances. There is also a legislative framework on wastes, which gives clear guidelines to identify what is a waste. On the contrary the concept of residues, in particular processing residues, has not been sufficiently defined neither in the RED nor in the EC’s communications.

This has already led the European Commission to give positive opinion on the application of the double counting mechanisms in dubious alignment with the rationale of the feedstocks diversification and additional benefits. For example, the Commission gave a positive opinion for the double counting of wine alcohol (raw alcohol from lees and marcs) in Italy if intended for fuel purposes, while this is being considered in other Member States.

In addition, compliance with the RED through voluntary certification schemes or in future bilateral agreements between the EU and third countries, coupled with a Member State implementation of the double counting, render certification even more complex.

These legislative gaps create a lot of uncertainty and undoubtedly lead to several interpretations in different states: one substance might be eligible for the double counting in State A, whereas it is not in State B, creating internal market distortions. Here, CEN may play a role as they have already started developing such definition in joint effort of industry and national legislators.
- Controls of its application are required.** Used cooking oils and animal fat from refining of animal slaughtering wastes seems to be eligible for the double counting. As a result, used cooking oil methyl esters (UCOME) and tallow methyl esters (TME) have arrived on the market in growing quantities and with prices exceeding those of rapeseed methyl esters. Since this double counting measure has been applied in only a few European states so far, UCOME and TME have flown to those countries creating important perturbation to the biofuels market. The volume of the UCOME deliveries and the comparatively small quantity of these feedstocks suggests that there may be some abuse of the system. Measures are to be put in place to check that the feedstock used is really a used cooking oil and/or to check that the biofuels corresponds to the declaration when consignments of blended biofuels are sold.
- Unfair competition and conflicts of use.** To a certain extent, the additional value given to the double counting biofuels may also give more flexibility to pay a premium for the collection of the feedstock when necessary. In extreme cases, this can divert some biomass from existing chains of value using the same feedstock, which could trigger conflicts of use. This can be the case for animal fat that may be diverted from oleochemistry.

Additionally, **giving the benefit of double counting for biofuels that are not really advanced biofuels creates unfair competition with really advanced biofuels pathways and thus delays their industrialization.**

Thus it is of high importance to keep the double counting support for cutting edge technologies with high potential of industrialization and good market fit.

Recommendations

- In order to avoid these negative impacts, the double counting measure should be applied exclusively for advanced biofuels that provide additional benefits, including the diversification of feedstocks, higher yields, and need time to be competitive. These are solely based on cutting edge technologies, new routes and/or new molecules with similar or improved quality.
- Residues for biofuel applications will have to be defined uniformly across Europe. A unique, European grid of analysis and associated selection criteria and a positive list of qualifying material, maintained by an independent body may well support this definition.
- In order to avoid risks due to fast changing regulations, it would be advisable to study the opportunity and the feasibility of awarding the double counting support to facilities (during for a fixed period of time) and not to the final product. This could be done through a European tender after a revision of the RED and under the condition that there would be an obligatory mutual recognition of the double counting status of biofuels consignment produced by the awarded plants.